



TECHNICAL SUPPORT DOCUMENT

**Air Discharge Permit ADP 22-3543
Air Discharge Permit Application CO-1059**

Issued: September 28, 2022

Kelso School District No. 458

SWCAA ID - 575

Prepared By: Wess Safford
Air Quality Engineer
Southwest Clean Air Agency

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1. Facility Identification	1
2. Facility Description	1
3. Current Permitting Action	1
4. Process Description	1
5. Equipment/Activity Identification	2
6. Emissions Determination	6
7. Regulations and Emission Standards	11
8. RACT/BACT/BART/LAER/PSD/CAM Determinations	13
9. Ambient Impact Analysis	14
10. Discussion of Approval Conditions	15
11. Start-up and Shutdown Provisions/Alternative Operating Scenarios/Pollution Prevention	16
12. Emission Monitoring and Testing	16
13. Facility History	16
14. Public Involvement Opportunity	17

ABBREVIATIONS

List of Acronyms

ADP	Air Discharge Permit	NSPS	New Source Performance Standard
AP-42	Compilation of Emission Factors, AP-42, 5th Edition, Volume 1, Stationary Point and Area Sources – published by EPA	PSD	Prevention of Significant Deterioration
ASIL	Acceptable Source Impact Level	RCW	Revised Code of Washington
BACT	Best available control technology	SQER	Small Quantity Emission Rate listed in WAC 173-460
CFR	Code of Federal Regulations	Standard	Standard conditions at a temperature of 68°F (20°C) and a pressure of 29.92 in Hg (760 mm Hg)
EPA	U.S. Environmental Protection Agency	SWCAA	Southwest Clean Air Agency
EU	Emission Unit	T-BACT	Best Available Control Technology for toxic air pollutants
NESHAP	National Emission Standards for Hazardous Air Pollutants	WAC	Washington Administrative Code
NOV	Notice of Violation/		

List of Units and Measures

acfm	Actual cubic foot per minute	MMcf	Million cubic feet
bhp	Brake horsepower	ppm	Parts per million
dscfm	Dry Standard cubic foot per minute	ppmv	Parts per million by volume
gr/dscf	Grain per dry standard cubic foot	ppmvd	Parts per million by volume, dry
hp	Horsepower	scfm	Standard cubic foot per minute
hp-hr	Horsepower-hour	tph	Ton per hour
kW	Kilowatt	tpy	Tons per year
MMBtu	Million British thermal unit		

List of Chemical Symbols, Formulas, and Pollutants

CO	Carbon monoxide	PM ₁₀	PM with an aerodynamic diameter 10 µm or less
CO ₂	Carbon dioxide	PM _{2.5}	PM with an aerodynamic diameter 2.5 µm or less
CO _{2e}	Carbon dioxide equivalent	SO ₂	Sulfur dioxide
HAP	Hazardous air pollutant listed pursuant to Section 112 of the Federal Clean Air Act	SO _x	Sulfur oxides
NO ₂	Nitrogen dioxide	TAP	Toxic air pollutant pursuant to Chapter 173-460 WAC
NO _x	Nitrogen oxides	VOC	Volatile organic compound
O ₂	Oxygen		
O ₃	Ozone		
PM	Particulate Matter with an aerodynamic diameter 100 µm or less		

Terms not otherwise defined have the meaning assigned to them in the referenced regulations or the dictionary definition, as appropriate.

1. FACILITY IDENTIFICATION

Applicant Name: Kelso School District No. 458
 Applicant Address: 601 Crawford Street, Kelso, WA 98626

Facility Name: Kelso School District No. 458
 Facility Address: Barnes Elementary School – 401 Barnes Street, Kelso WA
 Coweeman Middle School – 2000 Allen Street, Kelso WA
 Huntington Middle School – 500 Redpath Street, Kelso WA
 Kelso High School – 1904 Allen Street, Kelso WA
 Rose Valley Elementary School – 1502 Rose Valley Road, Kelso WA

SWCAA Identification: 575

Contact Person: Paul Richie, Supervisor of Facilities

Primary Process: Elementary and Secondary Schools
 SIC/NAICS Code: 8211: Elementary and Secondary Schools
 61111: Elementary and Secondary Schools

Facility Classification: Natural Minor

2. FACILITY DESCRIPTION

Kelso School District No. 458 (Kelso SD) is the public primary education provider for Kelso, Washington and surrounding areas.

3. CURRENT PERMITTING ACTION

This permitting action is in response to Air Discharge Permit application number CO-1059 (ADP Application CO-1059) dated August 22, 2022. Kelso SD submitted ADP Application CO-1059 requesting approval for the following:

- Replacement of existing boilers and water heaters at Huntington Middle School with two new hot water boilers and three new water heaters.
- Removal of Carrolls Elementary School from permit. (equipment removed)
- Removal of Butler Acres Elementary School from permit. (moved to ADP 21-3495)

ADP 22-3543 will supersede ADP 20-3381 in its entirety.

4. PROCESS DESCRIPTION

- 4.a Natural Gas and Diesel-Fired Heating and Cooking Equipment. Multiple natural gas-fired units are used to provide space heating, domestic hot water, pool heating, and for the kitchens. Diesel-fired boilers provide for the heating needs of the Rose Valley Elementary School and Carrolls Elementary School.
- 4.b Emergency Electricity. Diesel-fired emergency generator sets are located at the Kelso High School and Barnes Elementary School to provide emergency electrical power in the event of a power interruption.
- 4.c Wood Shop Dust Collector. A dust collector is used in the Kelso High School wood shop to control saw and sander dust from the facility. This dust collector is internally vented back into the wood shop.

5. EQUIPMENT/ACTIVITY IDENTIFICATION

5.a Kelso High School – Natural Gas-fired Equipment (existing). The following natural gas-fired equipment is installed at Kelso High School:

Unit Identification	Make	Model	Serial #	Year Built	Heat Input Capacity (MMBtu/hr)
Water heater 1 (WH-1) Kelso High Mech Rm 368	A. O. Smith	BTH 199 970	MD03-2401937-970	2003	0.1999
Water heater 2 (WH-2) Kelso High Mech Rm 213	A. O. Smith	BTH 199 970	MD03-2378051-970	2003	0.1999
Water heater 3 (WH-3) Kelso High Mech Rm 330	A. O. Smith	BTH 300A 970	B05M002558	2003	0.30
Water heater 4 (WH-4) Kelso High Mech Rm 432	A. O. Smith	BTH 199A	1924115287956	2019	0.1999
Water heater 5A (WH-5A) Kelso High Mech Rm 432	A. O. Smith	BTH 500A 200	1618M002365	2016	0.4999
Water heater 5B (WH-5B) Kelso High Mech Rm 432	A. O. Smith	BTH 500A 200	1619M000506	2016	0.4999
Water heater 6 (WH-6) Kelso High Mech Rm 383	A. O. Smith	BTH 300A 100	1234M000200	2012	0.30
Water heater 8 (WH-8) Kelso High Mech Rm 562	A. O. Smith	BTH 199 200	1508M000106	2015	0.1999
Water heater 9 (WH-9) Kelso High Mech Rm 562	A. O. Smith	BTH 199 200	1438M002419	2014	0.1999
Water heater 10 (WH-10) Kelso High Mech Rm 542	Bradford White	EF100T300E3N A2	PE39431120	2018	0.30
Water heater 11 (WH-11) Kelso High Mech Rm 542	Bradford White	EF100T300E3N A2	PK40320154	2018	0.30
Water heater 12 (WH-12) Kelso High Mech Rm 542	Bradford White	EF100T300E3N A2	PH40022143	2018	0.30
Boiler 1 (B-1) Kelso High Mech Rm 213	ATH/ Hydrotherm	KN6	7195708	2019	0.60
Boiler 2 (B-2) Kelso High Mech Rm 213	ATH/ Hydrotherm	KN6	7195712	2019	0.60
Boiler 3 (B-3) Kelso High Mech Rm 368	ATH/ Hydrotherm	KN6	7195711	2019	0.60
Boiler 4 (B-4) Kelso High Mech Rm 368	ATH/ Hydrotherm	KN6	7195713	2019	0.60
Boiler 5 (B-5) Kelso High Mech Rm 383	ATH/ Hydrotherm	KN6	7195714	2019	0.60
Boiler 6 (B-6) Kelso High Mech Rm 383	ATH/ Hydrotherm	KN6	7195710	2019	0.60
Boiler 7 (B-7) Kelso High Mech Rm 432	ATH/ Hydrotherm	KN6	7195715	2019	0.60
Boiler 9 (B-9) Kelso High Mech Rm 562	ATH	KN10-WW	111644810	2016	1.00
Boiler 10 (B-10) Kelso High Mech Rm 562	ATH	KN10-WW	111644852	2016	1.00
Boiler 11 (B-11) Kelso High Mech Rm 542	ATH	KN10-WW	121746613	2018	1.00

Unit Identification	Make	Model	Serial #	Year Built	Heat Input Capacity (MMBtu/hr)
Boiler 12 (B-12) Kelso High Mech Rm 542	ATH	KN10-WW	121746615	2018	1.00
Boiler 15 (B-15) Kelso High Mech Rm 330	ATH/ Hydrotherm	KN6	7195709	2019	0.60
Boiler 16 (B-16) Kelso High Mech Rm 330	ATH/ Hydrotherm	KN6	7195716	2019	0.60
Ovens 1 and 2 Kelso High kitchen	Alto-Shaam Combitherm	CTP7-20G	2403475-000, 2403474-000	2019	2 @ 0.98
Steam kettle 1 Kelso High kitchen	Groen	DHT/60	74152	2004	0.15
Steam kettle 2 Kelso High kitchen	Groen	DHT/60	74163	2004	0.15
Steam kettle 3 Kelso High kitchen	Groen	DHT/60	74164	2004	0.15
Space heater 1 Kelso High kitchen	Modine Mfg Co	Weatherhawk HFP400SMRLN8 0F4	1021904-9961	2004	0.40
Space heater 2 Kelso High kitchen	Modine Mfg Co	Weatherhawk HFP400SMRLN8 0F4	1021904-9962	2004	0.40
Stovetop oven 1 Kelso High Culinary Arts kitchen	Southbend	S36D	19F14416	2019	0.371
Stovetop oven 2 Kelso High Culinary Arts kitchen	Southbend	S36D	19F14604	2019	0.371
Stovetop oven 3 Kelso High Culinary Arts kitchen	Southbend	S36D	19F14312	2019	0.371
Stovetop oven 4 Kelso High Culinary Arts kitchen	Southbend	S36D	19F14605	2019	0.371
Stovetop oven 5 Kelso High Culinary Arts kitchen	Southbend	S36D	19F14558	2019	0.371
Stovetop oven 6 Kelso High Culinary Arts kitchen	Southbend	S36D	19F14418	2019	0.371
Space heater 1 Kelso High greenhouse	Dayton	3E230B	Q9543235	--	0.15
Space heater 2 Kelso High greenhouse	Dayton	3E230B	Q9543242	--	0.15
Space heater Kelso High batting cage	Trane	TUE140A960K2	N301WPH26	--	0.14
Water heater Kelso High stadium laundry	AO Smith	BC 160 770	770P B82 20941	--	0.16
Laundry dryer 1 Kelso High stadium	Cissel	L36CD36G	972-288	--	0.17
Laundry dryer 2 Kelso High stadium	Dexter	DN0080NC	D1.18229.003	--	0.215
Laundry dryer 3 Kelso High stadium	Dexter	DRH80	2070200194447	--	0.215

Total = 19.54

- 5.b Kelso High School Emergency Generator Engine (existing). This emergency generator engine is used to drive a Cummins emergency generator. The engine is described as follows:

Engine Make / Model: Cummins / 6BT5.9-G6 (s/n 46290112)
 Fuel: Diesel
 Fuel Consumption: ~8.5 gallons per hour at full standby load
 Horsepower Rating: 170 bhp at full standby load
 Engine Built: 2003
 Generator Set Make / Model: Cummins / DGDA-5601254 (s/n C030477912)
 Generator Set Output: 100 kW

Other Equipment:

Kelso High School Woodworking Shop. The Kelso High School Woodworking Shop is vented through a dust collector back into the main shop. There is a red fire blast exhaust on the building roof for an emergency exhaust bypass if a spark is detected. The unit has an hour meter and differential pressure gauge. The following equipment details were available:

Dust Collector Make Donaldson Torit Evolution
 Model: DFE 4-16
 Serial Number: 13636327
 Flow Rate: 9,800 cfm
 Filters: 16 with filter area of 120 ft², with a filter area of 1,920 ft²
 Ultra-Web SB filter media, MERV 15, rated at 0.002 gr/dscf.

The dust collector controlling emissions from the Kelso High School Wood Shop must remain internally vented. An air discharge permit application must be submitted and a final permit issued prior to any changes such as modifying the exhaust to vent externally.

Welding. The Kelso High School welding shop has the following equipment:

Arc welding stations – rod type (8)
 Oxy acetylene welding stations – wire type (9)

Kelso High School Paint Room. The Kelso High School paint room is used for brush application of small quantities of coatings.

- 5.c Huntington Middle School – Natural Gas-fired Equipment (modified). The following natural gas-fired equipment is installed at Huntington Middle School:

Unit Identification	Make	Model	Serial #	Year Built	Heat Input Capacity (MMBtu/hr)
Boiler 1 - Huntington – ATH	ATH	KN26 Plus	1228721	2022	2.6
Boiler 2 - Huntington - ATH	ATH	KN26 Plus	1228722	2022	2.6
Water heater 1 - Huntington – Bradford White	Bradford White	EF100T150E3NA2	XF48002641	2021	0.15
Water heater 2 - Huntington – Bradford White	Bradford White	EF100T150E3NA2	XJ48468431	2021	0.30
Water heater 3 - Huntington – Bradford White	Bradford White	EF100T150E3NA2	XH48334594	2021	0.15
Space heaters (2) – Wood Shop	Reznor	SC100	--		0.20

Total = 6.00

- 5.d Coweeman Middle School – Natural Gas-fired Equipment (existing). The following natural gas-fired equipment is installed at Coweeman Middle School:

Unit Identification	Make	Model	Serial #	Year Built	Heat Input Capacity (MMBtu/hr)
Boiler 1 - Coweeman - Burnham	Burnham Industrial	E-80	9010551	1991	3.348
Water heater 1 – Coweeman	A. O. Smith	BTR 275A 118	1117M002107	2011	0.275
Water heater 2 – Coweeman	A. O. Smith	BTR 275A 118	1323M001796	2013	0.275
Water heater 3 – Coweeman	A. O. Smith	BTR 270A 880	LF90-0009622-880	1989	0.270
Total =					4.17

- 5.e Barnes Elementary School – Natural Gas-fired Equipment. The following natural gas-fired equipment is installed at Barnes Elementary School:

Unit Identification	Make	Model	Serial #	Year Built	Heat Input Capacity (MMBtu/hr)
Water heater 1 – Barnes – Turbo Power	Turbo Power	375P 300A-TP	503110256	2003	0.3
Boiler 1 - Barnes – Aerco	Aerco	Benchmark 2.0 style 201177	G-03-342	2003	1.72
Space heater 1 (MAU-1) – Barnes – Trane	Trane	GRCA15GDMF0 N8CB102A0E48	F03C00597	2003	0.15
Ovens (2) - Barnes – Blodgett	Blodgett	DFG-100/200	not known	2003	0.11
Space heaters (RTU-1 thru 5) - Barnes - Trane	Trane	YCC060A3RHA1 401C00000A0B0 and YSC036A3EMA0 7C0C00000A000	RTU1: 312101203L RTU2: 312101204L RTU1: 312101205L RTU1: 312101207L RTU1: 312101233L	2003	0.45
Total =					2.73

- 5.f Barnes Elementary School Emergency Generator Engine. This emergency generator engine is used to drive a Generac emergency generator. The engine is described as follows:

Engine Make / Model: Kia / 3.0L HA
 Engine Serial Number: 0C2920
 Fuel: Diesel
 Horsepower Rating: ~ 30 bhp at full standby load (not available on engine tags or through Generac)
 Engine Built: May 13, 2003
 Generator Set Make / Model: Generac / 3190560200 Type SD0020-G363.OD
 Generator Serial Number: 2072344
 Generator Set Output: 20 kW
 Notes: The engine is not EPA Tier certified

- 5.g Rose Valley Elementary School – Boiler. The following diesel-fired boiler is installed at Rose Valley Elementary School:

Unit Identification	Make	Model	Serial #	Year Built	Heat Input Capacity (MMBtu/hr)
Boiler – Rose Valley – Weil-McLain	Weil-McLain	BL-976-W/EH	9386	1989	0.794

5.h Equipment/Activity Summary.

ID No.	Equipment/Activity	Control Equipment/Measure
1	Kelso High School – Natural Gas-fired Equipment	Low Sulfur Fuel (natural gas), Low Emission Burners (some units)
2	Huntington Middle School – Natural Gas-fired Equipment	Low Sulfur Fuel (natural gas), Low Emission Burners (some units)
3	Coweeman Middle School – Natural Gas-fired Equipment	Low Sulfur Fuel (natural gas)
4	Barnes Elementary School – Natural Gas-fired Equipment	Low Sulfur Fuel (natural gas)
5	Rose Valley Elementary School – Boiler	Ultra-Low Sulfur Diesel ($\leq 0.0015\%$ S)
6	Kelso High School – Emergency Generator Engine	Ultra-Low Sulfur Diesel ($\leq 0.0015\%$ S), Limited Operation
7	Barnes Elementary School – Emergency Generator Engine	Ultra-Low Sulfur Diesel ($\leq 0.0015\%$ S), Limited Operation

6. EMISSIONS DETERMINATION

Emissions to the ambient atmosphere from the new boilers and water heaters, as proposed in ADP Application CO-1059, consist of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM) sulfur dioxide (SO₂), toxic air pollutants (TAPs), and hazardous air pollutants (HAPs).

Unless otherwise specified by SWCAA, actual emissions must be determined using the specified input parameter listed for each emission unit and the following hierarchy of methodologies:

- (a) Continuous emissions monitoring system (CEMS) data;
- (b) Source emissions test data (EPA reference method). When source emissions test data conflicts with CEMS data for the time period of a source test, source test data must be used;
- (c) Source emissions test data (other test method); and
- (d) Emission factors or methodology provided in this TSD.

- 6.a Natural Gas-fired Equipment. Potential annual emissions from the combustion of natural gas at each school campus are calculated based on 8,760 hr/yr of operation at rated capacity and applicable emission factors as described below. Default emission factors are used except for units with low-emission burner designs.

Annual emissions will be calculated based on actual fuel consumption and applicable emission factors.

Natural Gas Fired Equipment - Default Emission Factors		
Pollutant	Emission Factor	
	lb/MMBtu	Emission Factor Source
NO _x	0.098	AP-42 Sec. 1.4 (7/98)
CO	0.082	AP-42 Sec. 1.4 (7/98)
VOC	0.0054	AP-42 Sec. 1.4 (7/98)
SO _x as SO ₂	0.0006	AP-42 Sec. 1.4 (7/98)
PM/PM ₁₀ /PM _{2.5}	0.0075	AP-42 Sec. 1.4 (7/98)
Benzene	2.1E-06	AP-42 Sec. 1.4 (7/98)
Formaldehyde	7.4E-05	AP-42 Sec. 1.4 (7/98)
CO _{2e}	117.1	40 CFR 98
Natural Gas Heat Content (AP-42 Factors) =		1,020 Btu/scf
Natural Gas Heat Content (40 CFR 98 Factors) =		1,028 Btu/scf

Natural Gas Fired Equipment - Low-emission Emission Factors		
Pollutant	Emission Factor	
	lb/MMBtu	Emission Factor Source
NO _x	0.036	30 ppm manufacturer
NO _x	0.024	20 ppm certification
CO	0.037	50 ppm manufacturer

Annual Potential-to-Emit Summary by School									
School	NO _x		CO		SO _x as PM/PM ₁₀ /		Benzene	Formaldehyde	CO _{2e}
	tons	tons	tons	tons	tons	tons			
Kelso High	4.73	4.51	0.42	0.05	0.58	1.6E-04	5.7E-03	9,068	
Huntington Middle	0.98	1.13	0.14	0.01	0.20	5.4E-05	1.9E-03	3,077	
Coweeman Middle	1.79	1.50	0.10	0.01	0.14	3.8E-05	1.3E-03	2,138	
Barnes Elementary	1.17	0.98	0.06	0.01	0.09	2.5E-05	8.8E-04	1,400	
Total =	8.67	8.13	0.72	0.08	1.01	2.8E-04	9.8E-03	15,683	

6.b Rose Valley Elementary School – Boiler (existing). Potential annual emissions from the combustion of ultra-low sulfur diesel in the boiler were calculated with the assumption that the boiler will operate at full rated capacity for 8,760 hours per year

Annual emissions will be calculated based on actual fuel consumption and applicable emission factors.

Rose Valley Elementary School - Boiler						
Heat Input Rating =	0.794 MMBtu/hr					
Diesel Heat Content =	0.138 MMBtu/gal (for use with GHG factors from 40 CFR 98)					
Fuel Sulfur Content =	0.0015% by weight					
Diesel Density =	7.206 lb/gallon					
Fuel Consumption =	49,682 gallons/year					
	Emission					
	Factor	Emissions	Emissions			
Pollutant	lb/M gal	lb/yr	tpy	Emission Factor Source		
NO _x	20	994	0.50	AP-42 Sec. 1.3 (5/2010)		
CO	5	248	0.12	AP-42 Sec. 1.3 (5/2010)		
VOC	0.34	17	0.01	AP-42 Sec. 1.3 (5/2010)		
SO _x as SO ₂	0.21618	11	0.01	Material Balance		
PM/PM ₁₀ /PM _{2.5}	3.3	164	0.08	AP-42 Sec. 1.3 (5/2010)		
			CO ₂ e	CO ₂ e		Emission Factor
Greenhouse Gases	kg/MMBtu	GWP	lb/MMBtu	lb/gallon	tpy, CO ₂ e	Source
CO ₂	73.96	1	163.05	23	559	40 CFR 98
CH ₄	0.003	25	0.165	0.023	1	40 CFR 98
N ₂ O	0.0006	298	0.394	0.054	1	40 CFR 98
Total GHG - CO ₂ e	74.0		163.6	23	561	

- 6.c Kelso High School – Emergency Generator Engine (existing). Potential annual emissions from the combustion of ultra-low sulfur diesel by the emergency generator engine were calculated with the assumption that the engine will operate at full rated capacity for 200 hours per year.

Annual emissions will be calculated based on actual hours of operation and applicable emission factors.

Kelso High School Emergency Generator Engine						
Annual Operation =	200 hours					
Power Output =	170 horsepower					
Diesel Density =	7.206 pounds per gallon					
Fuel Sulfur Content =	0.0015 % by weight					
Fuel Consumption Rate =	8.5 gal/hr (estimated assuming 7,000 Btu/hp-hr)					
Fuel Heat Content =	0.138 MMBtu/gal (for use with GHG factors from 40 CFR 98)					
	Emission					
	Factor	Emissions	Emissions			
Pollutant	lb/hp*hr	lb/hr	tpy	Emission Factor Source		
NO _x	0.031	5.27	0.53	AP-42 Table 3.3-1 (10/96)		
CO	0.00668	1.14	0.11	AP-42 Table 3.3-1 (10/96)		
VOC	0.00247	0.420	0.042	AP-42 Table 3.3-1 (10/96)		
SO _x as SO ₂		0.0018	0.00018	Mass Balance		
PM	0.0022	0.37	0.037	AP-42 Table 3.3-1 (10/96)		
PM ₁₀	0.0022	0.37	0.037	AP-42 Table 3.3-1 (10/96)		
PM _{2.5}	0.0022	0.37	0.037	AP-42 Table 3.3-1 (10/96)		
				CO ₂ e	CO ₂ e	Emission Factor
Greenhouse Gases	kg/MMBtu	GWP	lb/MMBtu	lb/gallon	tpy, CO ₂ e	Source
CO ₂	73.96	1	163.05	23	19	40 CFR 98
CH ₄	0.003	25	0.165	0.023	0.02	40 CFR 98
N ₂ O	0.0006	298	0.394	0.054	0.05	40 CFR 98
Total GHG - CO ₂ e	74.0		163.6	23	19	

6.d Barnes Elementary School – Emergency Generator Engine. Potential annual emissions from the combustion of ultra-low sulfur diesel by the emergency generator engine were calculated with the assumption that the engine will operate at full rated capacity for 200 hours per year.

Annual emissions will be calculated based on actual hours of operation and applicable emission factors.

Barnes Elementary Emergency Generator Engine						
Annual Operation =	200 hours					
Power Output =	30 horsepower					
Diesel Density =	7.206 pounds per gallon					
Fuel Sulfur Content =	0.0015 % by weight					
Fuel Consumption Rate =	1.5 gal/hr (estimated assuming 7,000 Btu/hp-hr)					
Fuel Heat Content =	0.138 MMBtu/gal (for use with GHG factors from 40 CFR 98)					
	Emission					
	Factor	Emissions	Emissions			
Pollutant	lb/hp*hr	lb/hr	tpy	Emission Factor Source		
NO _x	0.031	0.93	0.093	AP-42 Table 3.3-1 (10/96)		
CO	0.00668	0.20	0.020	AP-42 Table 3.3-1 (10/96)		
VOC	0.00247	0.074	0.0074	AP-42 Table 3.3-1 (10/96)		
SO _x as SO ₂		0.0003	0.00003	Mass Balance		
PM	0.0022	0.066	0.0066	AP-42 Table 3.3-1 (10/96)		
PM ₁₀	0.0022	0.066	0.0066	AP-42 Table 3.3-1 (10/96)		
PM _{2.5}	0.0022	0.066	0.0066	AP-42 Table 3.3-1 (10/96)		
				CO ₂ e	CO ₂ e	Emission Factor
Greenhouse Gases	kg/MMBtu	GWP	lb/MMBtu	lb/gallon	tpy, CO ₂ e	Source
CO ₂	73.96	1	163.05	23	3	40 CFR 98
CH ₄	0.003	25	0.165	0.023	0.003	40 CFR 98
N ₂ O	0.0006	298	0.394	0.054	0.008	40 CFR 98
Total GHG - CO ₂ e	74.0		163.6	23	3	

- 6.e Emissions Summary/Facility-wide Potential to Emit. Facility-wide potential to emit as calculated in the sections above is summarized below.

<u>Pollutant</u>	<u>Potential Emissions (tpy)</u>	<u>Project Increase (tpy)</u>
NO _x	9.79	-4.37
CO	8.39	-2.44
VOC	0.78	-0.09
SO ₂	0.08	-0.03
Lead	0.00	0.00
PM	1.12	-0.35
PM ₁₀	1.12	-0.35
PM _{2.5}	1.12	-0.35
TAP	0.01	0.00
HAP	0.01	0.00
CO _{2e}	16,267	-3,207

<u>Pollutant</u>	<u>CAS Number</u>	<u>Category</u>	<u>Facility-wide Emissions (lb/yr)</u>	<u>Project Increase (lb/yr)</u>	<u>WAC 173-460 SQER (lb/yr)</u>
Benzene	71-43-2	HAP/TAP A	0.5	-0.006	20
Formaldehyde	50-00-0	HAP/TAP A	19.7	-0.19	20

7. REGULATIONS AND EMISSION STANDARDS

Regulations that have been used to evaluate the acceptability of the proposed facility and establish emission limits and control requirements include, but are not limited to, the regulations, codes, or requirements listed below.

- 7.a Title 40 CFR Part 60.4200 et seq. "Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines" requires that new diesel engines meet specific emission standards at the point of manufacture and during operation. In addition, maximum fuel sulfur contents are specified and minimum maintenance standards are required. The Kelso High School Emergency Generator Engine and the Barnes Elementary School Emergency Generator Engine are not affected sources because they were both manufactured before the April 1, 2006 applicability date.
- 7.b 40 CFR 63.6580 et seq. "Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines" establishes national emission limitations and operating limitations for HAP emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. A new stationary RICE at an area source must comply with Subpart ZZZZ by meeting the requirements of 40 CFR 60 Subpart IIII for compression ignition engines or 40 CFR 60 Subpart JJJJ for spark ignition engines. 40 CFR 63.6585(f)(3) exempts from this regulation existing institutional emergency stationary rice located at area sources of HAP emissions that to not operate for demand response, voltage regulation, peak shaving or other financial arrangement with another entity. The Kelso High School Emergency Generator Engine and the Barnes Elementary School Emergency Generator Engine are existing institutional emergency stationary rice located at area sources of HAP and do not operate except for maintenance checks, readiness testing, and as necessary to supply emergency power; therefore these engines are not subject to this regulation.
- 7.c 40 CFR 63 Subpart JJJJJ "National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources" establishes performance standards and requirements for industrial, commercial and institutional boilers operating at an area source of hazardous air pollutants. All of the boilers cited in this permit except the boiler at Rose Valley Elementary School meet the definition of a "gas-fired boiler". Gas-fired boilers are not subject to Subpart JJJJJ. The diesel fired boiler at Rose Valley Elementary School is subject

to the regulation. The unit is classified as an existing oil-fired boiler and must conduct a tune-up as described in 40 CFR 63.11223 every five years.

- 7.d Revised Code of Washington (RCW) 70A.15.2040 empowers any activated air pollution control authority to prepare and develop a comprehensive plan or plans for the prevention, abatement and control of air pollution within its jurisdiction. An air pollution control authority may issue such orders as may be necessary to effectuate the purposes of the Washington Clean Air Act and enforce the same by all appropriate administrative and judicial proceedings subject to the rights of appeal as provided in Chapter 62, Laws of 1970 ex. sess.
- 7.e RCW 70A.15.2210 provides for the inclusion of conditions of operation as are reasonably necessary to assure the maintenance of compliance with the applicable ordinances, resolutions, rules and regulations when issuing an Air Discharge Permit for installation and establishment of an air contaminant source.
- 7.f WAC 173-460 "Controls for New Sources of Toxic Air Pollutants" requires Best Available Control Technology for toxic air pollutants (T-BACT), identification and quantification of emissions of toxic air pollutants and demonstration of protection of human health and safety. SWCAA implements WAC 173-460 as in effect on August 21, 1998.
- 7.g WAC 173-476 "Ambient Air Quality Standards" establishes ambient air quality standards for PM₁₀, PM_{2.5}, lead, sulfur dioxide, nitrogen dioxide, ozone, and carbon monoxide in the ambient air, which shall not be exceeded.
- 7.h SWCAA 400-040 "General Standards for Maximum Emissions" requires all new and existing sources and emission units to meet certain performance standards with respect to Reasonably Available Control Technology (RACT), visible emissions, fallout, fugitive emissions, odors, emissions detrimental to persons or property, sulfur dioxide, concealment and masking, and fugitive dust.
- 7.i SWCAA 400-050 "Emission Standards for Combustion and Incineration Units" requires that all provisions of SWCAA 400-040 be met and that no person shall cause or permit the emission of particulate matter from any combustion or incineration unit in excess of 0.23 grams per dry cubic meter (0.1 grains per dry standard cubic foot) of exhaust gas at standard conditions.
- 7.j SWCAA 400-060 "Emission Standards for General Process Units" prohibits particulate matter emissions from all new and existing process units in excess of 0.1 grains per dry standard cubic foot of exhaust gas.
- 7.k SWCAA 400-070(13) " General Requirements for Certain Source Categories: Natural Gas-Fired Water Heaters."
- (a) Applicability. The requirements of this section apply to all natural gas-fired water heaters with a rated heat input less than 400,000 Btu/hr. For the purposes of this subsection, the term "water heater" means a closed vessel in which water is heated by combustion of gaseous fuel and is withdrawn for use external to the vessel at pressures not exceeding 160 psig, including the apparatus by which heat is generated and all controls and devices necessary to prevent water temperatures from exceeding 210°F.
 - (b) Requirements.
 - (i) On or after January 1, 2010, no person shall offer for sale, or install, a water heater that emits NO_x at levels in excess of 55 ppmv at 3% O₂, dry (0.067 lb per million Btu of heat input).
 - (ii) On or after January 1, 2013, no person shall offer for sale, or install, a water heater that emits NO_x at levels in excess of 20 ppmv at 3% O₂, dry (0.024 lb per million Btu of heat input).
- 7.l SWCAA 400-109 "Air Discharge Permit Applications" requires that an Air Discharge Permit application be submitted for all new installations, modifications, changes, or alterations to process and emission control equipment consistent with the definition of "new source". Sources wishing to modify existing permit terms may submit an Air Discharge Permit application to request such changes. An Air Discharge Permit must be issued, or written confirmation of exempt status must be received, before beginning any actual construction, or implementing any other modification, change, or alteration of existing equipment, processes, or permits.

- 7.m SWCAA 400-110 "New Source Review" requires that SWCAA issue an Air Discharge Permit in response to an Air Discharge Permit application prior to establishment of the new source, emission unit, or modification.
- 7.n SWCAA 400-113 "Requirements for New Sources in Attainment or Nonclassifiable Areas" requires that no approval to construct or alter an air contaminant source shall be granted unless it is evidenced that:
- (1) The equipment or technology is designed and will be installed to operate without causing a violation of the applicable emission standards;
 - (2) Best Available Control Technology will be employed for all air contaminants to be emitted by the proposed equipment;
 - (3) The proposed equipment will not cause any ambient air quality standard to be exceeded; and
 - (4) If the proposed equipment or facility will emit any toxic air pollutant regulated under WAC 173-460, the proposed equipment and control measures will meet all the requirements of that Chapter.

8. RACT/BACT/BART/LAER/PSD/CAM DETERMINATIONS

The proposed equipment and control systems incorporate Best Available Control Technology (BACT) for the types and amounts of air contaminants emitted by the processes as described below:

New BACT Determinations

- 8.a BACT Determination – Huntington Boilers 1 and 2. The proposed use of low sulfur fuel (natural gas) and low emission burner design (≤ 30 ppm NO_x @ 3% O₂) has been determined to meet the requirements of BACT for hot water boilers at this facility.
- 8.b BACT Determination – Huntington Water Heaters 1 through 3. The proposed use of low sulfur fuel (natural gas) and low emission burner design (≤ 20 ppm NO_x @ 3% O₂) has been determined to meet the requirements of BACT for water heaters at this facility.

Previous BACT Determinations

- 8.c BACT Determination – Boilers B-1 Through B-7, B-15, B-16 (ADP 20-3381). Advanced Thermal Hydronics model KN-6 boilers B-1 through B-7, B-15 and B-16 have a heat input capacity of 0.60 MMBtu/hr each. These boilers comply with the South Coast Air Quality Management District's requirement to meet 20 ppm NO_x @ 3% O₂. However, based on practical experience as measured in SWCAA jurisdiction, these units are only capable of meeting 30 ppm NO_x @ 3% O₂ and 50 ppm CO @ 3% O₂ for these models. SWCAA has determined that BACT for such units is a NO_x emission concentration of no more than 30 ppmvd @ 3% O₂, therefore these units meet BACT for small boilers.
- 8.d BACT Determination – Water Heater WH-4 (ADP 20-3381). Water Heater WH-4 has a heating value of 0.199 MMBtu/hr. The use of low sulfur fuel (natural gas) has been determined to meet the requirement of BACT at the Permittee's facilities for equipment with a heat input of less than 0.5 MMBtu/hr.
- 8.e BACT Determination – Water Heaters 5A and 5B (ADP 17-3226). Water heaters WH-5A and WH-5B have a heat input capacity of 0.4999 MMBtu/hr each and are used regularly to support kitchen operations. Based on the availability and prevalence of relatively low-emission units in this size range, SWCAA has determined that BACT for such units is a NO_x emission concentration of no more than 30 ppmvd @ 3% O₂, and a CO emission concentration of no more than 50 ppmvd @ 3% O₂. Based on performance monitoring conducted in December 2016, NO_x emissions from these units exceeds 30 ppmvd @ 3% O₂, therefore these units do not achieve BACT emission levels. Installation of these units without prior approval was addressed by Notice of Violation 6025.
- 8.f BACT Determination – Boilers B-9 and B-10 (ADP 17-3226). Boilers B-9 and B-10 have a heat input capacity of 1.0 MMBtu/hr. Based on the availability and prevalence of relatively low-emission units in this size range, SWCAA has

determined that BACT for such units is a NO_x emission concentration of no more than 30 ppmvd @ 3% O₂, and a CO emission concentration of no more than 50 ppmvd @ 3% O₂. These units are capable of achieving these emission levels.

- 8.g RACT Statement – Sulfur Content of Boiler Fuel Oil (ADP 17-3226). No change was proposed for the oil-fired boilers and therefore these units did not undergo an individual BACT review. However, because fuel oil (diesel) containing no more than 15 ppm sulfur is now widely available and not significantly more expensive than fuel containing up to 500 ppm sulfur (in fact it might be cheaper due to wider availability), the use of fuel meeting this specification is required to meet the intent of the RACT requirements. The use of lower sulfur fuel will minimize SO₂ and PM emissions from the oil-fired boilers.
- 8.h BACT Determination – New Natural Gas-fired Equipment (ADP 09-2856). The use of low sulfur fuel (natural gas) has been determined to meet the requirement of BACT at the Permittee's facilities for equipment with a heat input of less than 0.5 MMBtu/hr. For the natural gas-fired equipment with capacities of equal to or greater than 0.5 MMBtu/hr, SWCAA believes that low emission burner technology (≤ 30 ppmvd NO_x @ 3% O₂ and ≤ 50 ppmvd CO @ 3% O₂) is generally necessary to meet the requirements of BACT. However, only the two new A. O. Smith model BTP 740A104 hot water heaters at Huntington Middle School meet this standard. The remaining "new" units are not equipped with low-emission packages. SWCAA had determined that the relatively low utilization of these units and annual emission monitoring of the units with a heat input capacity of 1.0 MMBtu/hr or larger will address this deficiency.
- 8.i BACT Determination – Emergency Generator Engines (ADP 09-2856). Available control measures for diesel engines include the use of ultra-low sulfur fuel and add-on control equipment such as selective catalytic reduction units. Add-on control equipment is not economically or technically feasible because the engines will be operated only for short periods of time for testing, maintenance, and to provide emergency electricity. Under normal operating conditions the engines will only be operated for short periods of time and the stable operating temperature required for operation of add-on control equipment will not be achieved.

SWCAA had determined that the use of modern diesel-fired engine design, the use of ultra-low sulfur diesel fuel ($\leq 0.0015\%$ sulfur by weight), limitation of visible emissions to 10% opacity or less, and limitation of engine operation to ≤ 200 hours per year has been determined to meet the requirements of BACT for the types and quantities of air contaminants emitted from these engines.

Other Determinations

- 8.j Prevention of Significant Deterioration (PSD) Applicability Determination. The potential to emit of this facility is less than applicable PSD applicability thresholds. Likewise, this permitting action will not result in a potential increase in emissions equal to or greater than the PSD thresholds. Therefore, PSD review is not applicable to this action.
- 8.k Compliance Assurance Monitoring (CAM) Applicability Determination. CAM is not applicable to any emission unit at this facility because it is not a major source and is not required to obtain a Part 70 permit.

9. AMBIENT IMPACT ANALYSIS

- 9.a TAP Small Quantity Review. The new equipment and modifications proposed in ADP Application CO-1059 will reduce the quantity of TAP emissions from the regulated equipment.

Conclusions

- 9.b Replacement of hot water boilers and water heaters, as proposed in ADP Application CO-1059, will not cause the ambient air quality requirements of Title 40 Code of Federal Regulations (CFR) Part 50 "National Primary and Secondary Ambient Air Quality Standards" to be violated.
- 9.c Replacement of hot water boilers and water heaters, as proposed in ADP Application CO-1059, will not cause the requirements of WAC 173-460 "Controls for New Sources of Toxic Air Pollutants" (as in effect 8/21/98) or WAC 173-476 "Ambient Air Quality Standards" to be violated.
- 9.d Replacement of hot water boilers and water heaters, as proposed in ADP Application CO-1059, will not cause a violation of emission standards for sources as established under SWCAA General Regulations Sections 400-040 "General Standards for Maximum Emissions," 400-050 "Emission Standards for Combustion and Incineration Units," and 400-060 "Emission Standards for General Process Units."

10. DISCUSSION OF APPROVAL CONDITIONS

SWCAA has made a determination to issue ADP 22-3543 in response to ADP Application CO-1059. ADP 22-3543 contains approval requirements deemed necessary to assure compliance with applicable regulations and emission standards as discussed below.

- 10.a Supersession of Previous Permits. ADP 22-3543 supersedes ADP 20-3381 in its entirety.
- 10.b General Basis. Permit requirements for equipment affected by this permitting action incorporate the operating schemes proposed by the applicant in ADP Application CO-1059. Permit requirements established by this action are intended to implement BACT, minimize emissions, and assure compliance with applicable requirements on a continuous basis. Emission limits for approved equipment are based on the maximum potential emissions calculated in Section 6 of this Technical Support Document.
- 10.c Monitoring and Recordkeeping Requirements. ADP 22-3543 establishes monitoring and recordkeeping requirements sufficient to document compliance with applicable emission limits, ensure proper operation of approved equipment and provide for compliance with generally applicable requirements. Specific requirements are established for fuel consumption and hours of operation.
- 10.d Reporting Requirements. ADP 22-3543 establishes general reporting requirements for annual air emissions, upset conditions and excess emissions. Specific reporting requirements are established for fuel consumption and hours of operation. Reports are to be submitted on an annual basis.
- 10.e Emergency Generators. Visible emissions from the diesel-fired engines were limited to 10% opacity. Due to the technical limitations of the engine, the opacity limit does not apply during periods of start-up and shutdown. Annual operation is monitored with an integral hourmeter and reported to SWCAA by the source. Because emissions from the emergency generator engines were reviewed only for the scenario where the units are fired on ultra-low sulfur #2 diesel, operation of the units on other, potentially dirtier, fuels are prohibited. The permit allows the use of "#2 diesel or better." In this case, "or better" includes road-grade diesel fuel with a lower sulfur content, biodiesel, and mixtures of biodiesel and road-grade diesel.

Consistent with federal requirements for emergency engines found in 40 CFR 60 Subpart III and 40 CFR 60 Subpart ZZZZ, the 200 hour per year operation limitation for the emergency generator engines that applied to all operation (including emergency operation), was modified to 100 hours for maintenance checks and readiness testing, with no limitation on emergency use.

- 10.f Boilers and Water Heaters. Annual emission limits for all of the fuel burning equipment at each school were established at the quantity of emissions anticipated from operation of each emissions unit for 8,760 hours per year at full rated load using the emission factors supplied in Section 6. Visible emissions from the natural gas-fired emission units were limited to 0% opacity. The opacity limit for the Rose Valley Elementary School diesel-fired boiler was set at 5%, which is consistent with other diesel-fired boilers. Annual fuel consumption is monitored and reported to SWCAA by the source.
- 10.g Requirements for Unmodified Emission Units. Permit requirements for existing emission units not affected by ADP Application CO-1059 are carried forward unchanged from ADP 20-3381.

11. START-UP AND SHUTDOWN/ALTERNATIVE OPERATING SCENARIOS/POLLUTION PREVENTION

- 11.a Start-up and Shutdown Provisions. Pursuant to SWCAA 400-081 "Start-up and Shutdown", technology based emission standards and control technology determinations shall take into consideration the physical and operational ability of a source to comply with the applicable standards during start-up or shutdown. Where it is determined that a source is not capable of achieving continuous compliance with an emission standard during start-up or shutdown, SWCAA shall include appropriate emission limitations, operating parameters, or other criteria to regulate performance of the source during start-up or shutdown.

The emergency generator engines may exhibit excess opacity upon startup. Accordingly, the opacity limits are not applicable during the startup periods defined in the permit. The general limitation from SWCAA 400 of 20% opacity continues to apply during startup.

- 11.b Alternate Operating Scenarios. SWCAA conducted a review of alternate operating scenarios applicable to equipment affected by this permitting action. The permittee did not propose or identify any applicable alternate operating scenarios. Therefore, none were included in the permit requirements.
- 11.c Pollution Prevention Measures. SWCAA conducted a review of possible pollution prevention measures for the facility. No pollution prevention measures were identified by either the permittee or SWCAA separate or in addition to those measures required under BACT considerations. Therefore, none were included in the permit requirements.

12. EMISSION MONITORING AND TESTING

- 12.a Emission Monitoring – Boilers. Emission monitoring of each boiler and water heater with a heat input of 1.0 MMBtu/hr or more with a combustion analyzer or equivalent is required on a continuing 12-month cycle. All emission monitoring shall be conducted in accordance with ADP 22-3543, Appendix A.

13. FACILITY HISTORY

- 13.a Previous Permitting Actions. SWCAA has previously issued the following Permits for this facility:

<u>Date</u>	<u>Permit Number</u>	<u>Application Number</u>	<u>Purpose</u>
11/17/2021	21-3495	CO-1043	Installation two new ATH KN-10 natural gas fired boilers and two Bradford White hot water heaters at Butler Acres Elementary School.
8/13/2020	20-3428	CO-1028	Installation of two ATH KN26 natural gas fired boilers, four Bradford White water heaters, and a Cummins emergency diesel engine at the new Lexington Elementary School.

<u>Date</u>	<u>Permit Number</u>	<u>Application Number</u>	<u>Purpose</u>
6/25/2020	20-3418	CO-1027	Installation of two new natural gas fired boilers at the new Wallace Elementary School.
1/27/2020	20-3381	CO-1016	Installation of replacement equipment at Kelso High School (nine boilers, one hot water tank, one dust collector, one steamer oven, six natural gas fired ovens, one cyclone dust collector, arc welding stations and oxy acetylene welding stations).

Obsolete/Superseded

1/30/2018	SUN-158		Approval of an Advanced Thermal Hydronics KN-10 natural gas-fired boiler identified as B-11.
1/30/2018	SUN-159		Approval of an Advanced Thermal Hydronics KN-10 natural gas-fired boiler identified as B-12.
5/2/2017	17-3226	CO-972	Approval of several natural gas-fired units at the Kelso High School. Superseded by ADP 20-3381.
3/17/2009	09-2856	CO-870	Approval of several natural gas-fired units and two diesel-fired emergency generator sets that were previously unpermitted. Superseded by ADP 17-3226.
4/16/1991	90-1281	CO-417	Approval for remediation of approximately 60 cubic yards of diesel contaminated soil ("non-detect" levels of diesel) by laying out soil out in tarped beds for bioremediation at Huntington Middle School. The permit was issued to Cowlitz Clean Sweep – Longview, WA. Superseded by ADP 09-2856.
3/6/1990	89-1152	CO-388	Approval to install Weil McLain diesel fired boiler at Rose Valley Elementary School. Superseded by ADP 09-2856.
11/26/1980	80-557	CO-266	Approval to install dry filtration media to the paint spraying room at the school district's facility at Grade and Allen Streets in Kelso. As of 2009 this area is used as a storage room and was removed from registration. Superseded by ADP 09-2856.
2/24/1975	75-0224LET	CO-164	Approval to alter the existing paint spray booth at Huntington Junior High School. Superseded by ADP 09-2856.
8/21/1970	70-0821LET	CW-0017	Approval of new Kelso High School. Superseded by ADP 09-2856.

- 13.b Compliance History. A search of source records on file at SWCAA did not identify any outstanding compliance issues at this facility.

14. PUBLIC INVOLVEMENT OPPORTUNITY

- 14.a Public Notice for ADP Application CO-1059. Public notice for ADP Application CO-1059 was published on the SWCAA internet website for a minimum of (15) days beginning on September 8, 2022.

- 14.b Public/Applicant Comment for ADP Application CO-1059. SWCAA did not receive specific comments, a comment period request or any other inquiry from the public regarding this ADP application. Therefore no public comment period was provided for this permitting action.
- 14.c State Environmental Policy Act. This project is exempt from SEPA requirements pursuant to WAC 197-11-800(3) since it only involves repair and/or maintenance of existing structures, equipment or facilities, and will not involve material expansions or changes in use. SWCAA issued a Determination of SEPA Exempt (SWCAA 22-031) concurrent with issuance of ADP 22-3543.